Name:____

Math 150 Chapter 5 Review Ms. Meier

Note ** Integrals can be evaluated with a calculator unless otherwise indicated**

1) Given the supply and demand functions: $D(x) = (x-9)^2$ and $S(x) = x^2 + 2x + 1$ where x is the units and D(x) and S(x) is the price in dollars, find each.

a) The equilibrium point

b) The consumer's surplus at equilibrium

c) The producer's surplus at equilibrium

d) Graph D(x) and S(x) and indicate all of the above.

2) An economist produced the following Lorenz curves for the distribution of total assets in the U.S. in 1963 and 1983 respectively: $L_1 = x^{10}$ (1963) and $L_2 = x^{12}$ (1983). Find the Gini Index for each Lorenz curve and interpret/compare the results.

3) Find the future value of an income stream where \$100 is deposited the first month and is increased by \$10 each month thereafter for 10 years and earns 6% annual interest compounded continuously.

4) You wish to have a scholarship in your name for \$1200 each year to a deserving business student, awarded indefinitely. How much should you donate, at 5.5% interest compounded continuously, to establish your scholarship?

5) A restaurant determined the length of time t, in minutes, that a customer must wait for an order has a probability density function of: $f(t) = 0.02e^{-0.02t}$ for $t \ge 0$

a) Find the probability that a customer will wait no more than 20 minutes

b) Find the probability a customer must wait more than 15 minutes for an order

6) Solve the differential equations:

a)
$$\frac{dy}{dx} = \frac{10x^4}{y}$$
 b) $\frac{dy}{dx} = 6x^2 + 2$ and $y = 8$ when $x = 0$

c) Find R(x) given $MR(x) = R'(x) = 8x^3 - 3x^2 + 4x - 5$ and R(x)=146 when x = 3

d)
$$\frac{dp}{dc} = 8c^2p$$

Answers:

1) a. (4, 25) b) C.S. = \$101.33 c) P.S. = \$58.67 d) Graph on window [0,10] by [0,100]

2) Gini Index for 1963 = 0.818, Gini Index for 1983 = 0.846. In 1963 the distribution of total assets in the U.S. was more evenly distributed (equitable) than in 1983.

3) F.V.= \$105,289.90

4) Capital Value = \$21,818.18

5) a. Probability for wait less than 20 min. is 0.3297b. Probability for wait more than 15 minutes is 0.7408

6) a. $y = \pm \sqrt{4x^5 + C}$ b. $y = 2x^3 + 2x + 8$ c. $R(x) = 2x^4 - x^3 + 2x^2 - 5x + 8$ d. $p = C_1 e^{8/3c^3}$